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ORIGINAL RESEARCH

Early Forecasting Of Diabetic Nephropathy By Neutrophil-Lymphocyte Ratio In Type 2 Diabetes Mellitus Patients

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ABSTRACT:

Background: Diabetes Mellitus (DM) is the most prevalent endocrinal disorder distinguished by hyperglycemia arising from faults in insulin secretion, insulin action or both and is related with remarkable morbidity and mortality. Diabetic nephropathy is a serious microvascular complication which can seriously affect the kidneys in diabetic patients. Neutrophil-Lymphocyte ratio has close association with development and progression of diabetic nephropathy.
Objective: To study Neutrophil-Lymphocyte ratio (NLR) in Type 2 diabetes Mellitus patients with and without complications of diabetic nephropathy.
Material and Methods: A cross sectional study was conducted on 75 Type 2 diabetes patients. Detailed clinical history regarding duration, and complications was taken. NLR was obtained using automated cell counter. Fasting blood glucose, HbA1c were also obtained. Diabetics were further categorized into patients with complications and without complications of diabetic nephropathy. **Results and Interpretation:** NLR were significantly (p=0.001) higher among patients with diabetic nephropathy than without diabetic nephropathy.
Conclusion: NLR is significantly increased in microvascular complication diabetic nephropathy in type 2 diabetes patients and can be considered as predictive marker of diabetic microvascular complication.

Key Words: Diabetes mellitus, diabetic nephropathy, NLR.

INTRODUCTION

Diabetes Mellitus (DM) is the most prevalent endocrinal disorder distinguished by hyperglycaemia resulting from faults in insulin secretion, insulin action or both and is related with remarkable morbidity and mortality.
Microvascular complication like diabetic nephropathy eventually determines the mortality of diabetes and is a burden on the health care system. Studies have shown that inflammation plays a key part in the evolution of Diabetes Mellitus.[1]Glycated proteins results in damage to cells and impair their function, which induces the production of inflammatory cytokines like C-Reactive Protein, Tumour Necrosis Factor-alpha (TNF-α), interleukin -6 (IL-6) and free radicals. Activation of inflammatory processes appears to be one of the significant mechanisms responsible for vascular damage leading to clinically well recognized complications of diabetes mellitus.[2]NLR is a novel marker of chronic inflammation that manifests a balance of two interdependent components of the immune system; neutrophils, which mediate the first line of inflammatory defence, and lymphocytes are the regulatory and protective component of inflammation.[3]An index has thus been subsequently generated to reflect both neutrophilia, which accompanies the acute state of inflammation, and lymphopenia, which is a response to physiological stress. This index, which is the Neutrophil-Lymphocyte Ratio (NLR), has been demonstrated to be a reliable indicator of the inflammatory status. [4] NLR is coming up as an easy parameter to estimate inflammatory status of a patient in contrast to estimation of interleukin-1, interleukin-6, TNF-alpha, etc which are exorbitant and clumsy. Since there are not many Indian studies concerning evaluation of Neutrophil-Lymphocyte Ratio in type 2 DM patients having microvascular complication diabetic nephropathy, this study has been undertaken to assess Neutrophil-Lymphocyte Ratio and its association with microvascular complication diabetic nephropathy in type 2 diabetic patients.

MATERIAL AND METHODS

This study was conducted in Department of Medicine, SGT Medical College, SGT University, Gurugram, Haryana, India. 75 patients in the age group 35 years to 70 years were selected for the study. NLR was studied in the cases and was correlated with diabetic nephropathy. Laboratory results in these patients were analysed & frequency of abnormal results was evaluated. Consent was taken from the patients prior to involving them in the study on a consent form. Correct procedure of the test was well explained to all the patients. After taking

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permission from the ethical committee of SGT medical college and written consent of patients, a cross-sectional study was carried out in the medicine department of SGT medical college and hospital. Inclusion criteria was FBG level ≥ 126 mg/dL, HbA1c level ≥ 6.5%, RBS ≥ 200 mg/dL with symptoms of diabetes. Exclusion criteria was females with Hb% <10 g% & males with Hb% less than 12 g%, pregnant women, patients on antiplatelet drugs like aspirin or having malignancy, chronic heart disease. Blood sample was taken under all aseptic precautions from the ante-cubital vein by a clean puncture avoiding bubbles and froth. About 2 ml of blood sample was collected in EDTA, fluoride bulb, and plain bulb each. Complete hemogram was performed by using automatic blood counter (Sysmex XN-550, USA) from EDTA bulb. Differential leucocyte count (DLC) was recorded and neutrophil-lymphocyte ratio was determined.

Statistical analysis: The data collected was entered into the M-S excel sheet and SPSS. The results were analysed using software Statistical Software Package of Social Sciences (SPSS) 16.0 version (Chicago, Inc., USA).The results were presented in percentages and mean ± SD. The Chi-square test was used to compare categorical variables. The Unpaired t-test was used to compare continuous variables. P value <0.05 was considered significant and p value < 0.01 was considered as very significant.

RESULTS:

NLR was significantly (p=0.001) higher among patients with diabetic nephropathy (4.52±1.45) than without diabetic nephropathy (3.19±1.01).

Table-1: Comparison of NLR with and without diabetic nephropathy.

Diabetic Nephropathy	NLR (Mean±SD)
Present	4.52±1.45
Absent	3.19±1.01
p-value[1]	0.001*

[1]Unpaired t-test, Significant

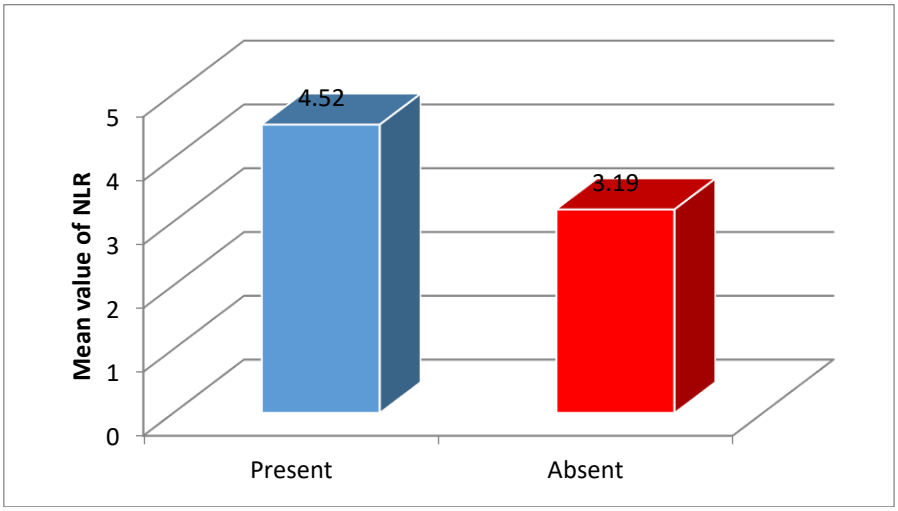

Figure 1: Comparison of NLR with and without diabetic nephropathy.

Table-1 & Fig. 1 shows the comparison of NLR with and without diabetic nephropathy. NLR was significantly (p=0.001) higher among patients with diabetic nephropathy (4.52±1.45) than without diabetic nephropathy (3.19±1.01).

Discussion

Diabetes mellitus is a global health problem characterized by persistent hyperglycaemia that can cause both acute and chronic complications. The worldwide prevalence of type 2 diabetes mellitus is on the increase due to increasing obesity, rapid industrialization, and ageing of the population. Metabolic dysregulation secondary to diabetes results in pathophysiological changes in multiple organ systems which subsequently impose an enormous burden on the individual as well as the healthcare system. The microvascular complications of diabetes are nephropathy, retinopathy, and neuropathy. Hyperglycaemia in diabetes leads to generation of glycated proteins that damage the cells in various ways, including impaired cellular function, and subsequently causes the production of inflammatory cytokines like C-Reactive Protein, TNF-alpha, Interleukin-6, etc. This inflammation

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contributes to development of microvascular complications. Neutrophil- Lymphocyte Ratio (NLR) is an inexpensive and easily available marker to evaluate the inflammatory status in these patients.

Age distribution of the cases ranged from 35-70 years with mean age of 51.41± 10.64. Maximum patients were in the age group 40 to 50 years while least number of patients were in the age group 35-40 years. A study conducted in geriatric population also suggested that increased NLR levels were in itself an independent predictor for microvascular complications of DM.[5]Afsar has shown that NLR could be related to Diabetic nephropathy and is also correlated as an indicator of End Stage Renal Disease.[6] In another study, Akbas et al.[7] have shown that NLR was significantly elevated in patients with increased albuminuria pointing towards a relationship between inflammation and endothelial dysfunction in diabetics with nephropathy. Moreover, in a 3-year follow-up study of diabetic patients, NLR served as a predictor of worsening renal function.[10] Ciray et al also found NLR to be a sensitive predictor of diabetic nephropathy.[11]Numerous studies have shown that elevated NLR was linked with the presence of Diabetic nephropathy [8,9,11,12]

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